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Vickie Ishimaru

Vickie Ishimaru

Docket No.: 27-006

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Virgil Cotoco Ararao et al.	: Confirmation No.:	6546
Serial No.:	10/721,916	: Art Unit:	2813
Filed:	11/24/2003	: Examiner:	Thanh T. Nguyen
For:	FABRICATION METHOD FOR SEMICONDUCTOR PACKAGE HEAT SPREADERS	:	

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir/Madam:

The following Appeal Brief is submitted pursuant to the Notice of Appeal filed April 30, 2007 in the above-identified Application, and within the one month reply period of the Notice of Panel Decision from Pre-Appeal Brief Review mailed June 4, 2007, in the above-identified Application.

TABLE OF CONTENTS

(1) Real party in interest

The real party in interest is ST Assembly Test Services Ltd. having its principal place of business in Singapore, Republic of Singapore.

*(2) **Related appeals and interferences***

There are no known related appeal or interference cases.

(3) Status of claims

Claims 1-10 and 21-30 are pending in the present application and stand under final rejection, from which rejection this Appeal is taken.

Claims 11-20 have been canceled.

(4) Status of amendments

No amendments have been filed subsequent to the final rejection of January 29, 2007.

(5) Summary of claimed subject matter

The following concise explanation of the invention by numbering and insertion of reference pages (p.) and line numbers (l) is intended to be exemplary and not limiting.

1. A method [2900] for fabricating a semiconductor heat spreader [200], comprising:

providing [2902] a unitary metallic plate [200] (p. 14, l. 22; p. 6, l. 17; p. 10, l. 27–29); and

forming [2904] the unitary metallic plate [200] into (p. 14, l. 22–26):

a panel [206] (p. 7, l. 3–4);

channel walls [210] depending from the panel [206] to define a channel [208] between the channel walls [210] and the panel [206] for receiving a semiconductor therein (p. 7, l. 4–6; p. 7, l. 32);

at least two feet [214] extending from respective channel walls [210] for attachment to a substrate [204] (p. 7, l. 8–9);

at least one external reversing bend [222] (p. 7, l. 27); and

a cross-sectional profile of the plate [200] that is substantially constant along at least one horizontal direction [202] that is perpendicular to the cross-sectional profile of the plate [200] (p. 6, l. 18–20).

2. The method [2900] of claim 1 wherein the feet [214] are selected from an arched foot [214], a stand-off foot [602], a slotted stand-off foot [1202], a toed foot [702], a stand-off toed foot [802], a flat foot [902], a slotted flat foot [902], a zigzag foot [1502], a box foot [1602], and a combination thereof (p. 7, l. 8; p. 8, l. 26–27; p. 10, l. 17–18; p. 9, l. 9; p. 9, l. 17–18; p. 9, l. 29; p. 9, l. 29; p. 11, l. 19–20; p. 12, l. 6).

3. The method [2900] of claim 1 further comprising forming the feet [214] to accommodate respective set volumes of adhesive [218] therebeneath for attaching the semiconductor heat spreader [200] to a substrate [204] (p. 7, l. 12–19).

4. The method [2900] of claim 1 further comprising forming an electromagnetic interference shield [500] for the channel [208] (p. 8, l. 13–15).

5. The method [2900] of claim 1 further comprising:

providing an additional unitary metallic plate [500] (p. 8, l. 18); and

forming the additional unitary metallic plate [500] into a unitary auxiliary heat spreader [500] configured for attachment on top of the semiconductor heat spreader [200] (p. 8, l. 17–19).

6. The method of claim 5 further comprising forming attachment means for attaching the unitary auxiliary heat spreader [500] to the semiconductor heat spreader [200], the attachment means being selected from tabs [502], locking tabs [502], deformable sides [1408], side ledges [1404], side clips [1610], clip bosses [1612], center clips [1808], side arms [1908], and a combination thereof (p. 8, l. 21; p. 8, l. 21; p. 11, l. 16; p. 11, l. 15; p. 12, l. 10; p. 12, l. 11; p. 12, l. 26–27; p. 13, l. 1).

7. The method [2900] of claim 1 wherein forming the unitary metallic plate further comprises forming the unitary metallic plate [1300] in substantially a single metal forming process to also form an integral auxiliary heat spreader [1302] located on top of the panel [1308] (p. 11, l. 1–3).

8. The method [2900] of claim 1 wherein forming [2904] the unitary metallic plate [200] further comprises forming the unitary metallic plate [200] in substantially a single metal forming process into a cross-sectional profile that is substantially constant in at least one horizontal direction [202] (p. 6, l. 18–24).

9. A method for fabricating a semiconductor heat spreader [200], comprising:

providing a unitary metallic plate [200] (p. 6, l. 17; p. 10, l. 27–29);

forming the unitary metallic plate [200] in substantially a single metal forming process into (p. 6, l. 22–24):

a panel [206] (p. 7, l. 3–4);

channel walls [210] depending from opposite sides of the panel [206] to define a channel [208] between the channel walls [210] and the panel [206] for receiving a semiconductor therein (p. 7, l. 4–6; p. 7, l. 32);

at least two feet [214] extending from respective channel walls [210] on opposite sides of the panel [206] for attachment to a substrate [204], the feet [214] being (p. 7, l. 8–9):

selected from an arched foot [214], a stand-off foot [602], a slotted stand-off foot [1202], a toed foot [702], a stand-off toed foot [802], a flat foot [902], a slotted flat foot [902], a zigzag foot [1502], a box foot [1602], and a combination thereof (p. 7, l. 8; p. 8, l. 26–27; p. 10, l. 17–18; p. 9, l. 9; p. 9, l. 17–18; p. 9, l. 29; p. 9, l. 29; p. 11, l. 19–20; p. 12, l. 6); and

formed to accommodate respective set volumes of adhesive [218] therebeneath for attaching the semiconductor heat spreader [200] to a substrate [204] (p. 7, l. 12–19);

a cross-sectional profile of the plate [200] that is substantially constant along at least one horizontal direction [202] that is perpendicular to the cross-sectional profile of the plate [200] (p. 6, l. 18–20); and

at least one external reversing bend [222] (p. 7, l. 27).

10. The method of claim 9 further comprising:

providing an additional unitary metallic plate [500] (p. 8, l. 18);

forming the additional unitary metallic plate [500] in substantially a single metal forming process into a unitary auxiliary heat spreader [500] configured for attachment on top of the semiconductor heat spreader [200] (p. 8, l. 17–19); and

forming attachment means for attaching the unitary auxiliary heat spreader [500] to the semiconductor heat spreader [200], the attachment means being selected from tabs [502], locking tabs [502], deformable sides [1408], side ledges [1404], side clips [1610], clip bosses [1612], center clips [1808], side arms [1908], and a combination thereof (p. 8, l. 21; p. 8, l. 21; p. 11, l. 16; p. 11, l. 15; p. 12, l. 10; p. 12, l. 11; p. 12, l. 26–27; p. 13, l. 1).

Claims 11-20 (canceled)

21. A method for fabricating a semiconductor heat spreader [200], comprising:

providing a unitary metallic plate [200] (p. 14, l. 22; p. 6, l. 17; p. 10, l. 27–29);

forming the unitary metallic plate [200] into (p. 14, l. 22–26):

a panel [206] (p. 7, l. 3–4);

channel walls [210] depending from the panel [206] to define a channel [208] between the channel walls [210] and the panel [206] for receiving a semiconductor therein (p. 7, l. 4–6; p. 7, l. 32);

at least two feet [214] extending from respective channel walls [210] for attachment to a substrate [204] (p. 7, l. 8–9);

at least one external reversing bend [222] (p. 7, l. 27); and

a cross-sectional profile of the plate [200] that is substantially constant along at least one horizontal direction [202] that is perpendicular to the cross-sectional profile of the plate [200] (p. 6, l. 18–20); and

forming the unitary metallic plate to also form an integral auxiliary heat spreader [1302] located on top of the panel [1308] (p. 11, l. 1–3).

22. The method of claim 21 wherein the feet [214] are selected from an arched foot [214], a stand-off foot [602], a slotted stand-off foot [1202], a toed foot [702], a stand-off toed foot [802], a flat foot [902], a slotted flat foot [902], a zigzag foot [1502], a box foot [1602], and a combination thereof (p. 7, l. 8; p. 8, l. 26–27; p. 10, l. 17–18; p. 9, l. 9; p. 9, l. 17–18; p. 9, l. 29; p. 9, l. 29; p. 11, l. 19–20; p. 12, l. 6).

23. The method of claim 21 further comprising forming the feet [214] to accommodate respective set volumes of adhesive [218] therebeneath for attaching the semiconductor heat spreader [200] to a substrate [204] (p. 7, l. 12–19).

24. The method of claim 21 further comprising forming an electromagnetic interference shield [500] for the channel [208] (p. 8, l. 13–15).

25. The method of claim 21 further comprising:

providing an additional unitary metallic plate [500] (p. 8, l. 18); and

forming the additional unitary metallic plate [500] into a unitary auxiliary heat spreader [500] configured for attachment on top of the semiconductor heat spreader [200] (p. 8, l. 17–19).

26. The method of claim 25 further comprising forming attachment means for attaching the unitary auxiliary heat spreader [500] to the semiconductor heat spreader [200], the attachment means being selected from tabs [502], locking tabs [502], deformable sides [1408], side ledges [1404], side clips [1610], clip bosses [1612], center clips [1808], side

arms [1908], and a combination thereof (p. 8, l. 21; p. 8, l. 21; p. 11, l. 16; p. 11, l. 15; p. 12, l. 10; p. 12, l. 11; p. 12, l. 26–27; p. 13, l. 1).

27. The method of claim 21 wherein forming the unitary metallic plate further comprises forming the unitary metallic plate [1300] in substantially a single metal forming process to also form an integral auxiliary heat spreader [1302] located on top of the panel (p. 11, l. 1–3).

28. The method of claim 21 wherein forming the unitary metallic plate [200] further comprises forming the unitary metallic plate [200] in substantially a single metal forming process into a cross-sectional profile that is substantially constant in at least one horizontal direction [202] (p. 6, l. 18–24).

29. A method for fabricating a semiconductor heat spreader [200], comprising:

providing a unitary metallic plate [200] (p. 6, l. 17; p. 10, l. 27–29);

forming the unitary metallic plate [200] into (p. 6, l. 17:

a panel [206] (p. 7, l. 3–4);

channel walls [210] depending from opposite sides of the panel [206] to define a channel [208] between the channel walls [210] and the panel [206] for receiving a semiconductor therein (p. 7, l. 4–6; p. 7, l. 32);

at least two feet [214] extending from respective channel walls [210] on opposite sides of the panel [206] for attachment to a substrate [204], the feet [214] being (p. 7, l. 8–9):

selected from an arched foot [214], a stand-off foot [602], a slotted stand-off foot [1202], a toed foot [702], a stand-off toed foot [802], a flat foot [902], a slotted flat foot [902], a zigzag foot [1502], a box foot [1602], and a combination thereof (p. 7, l. 8; p. 8, l. 26–27; p. 10, l. 17–18; p. 9, l. 9; p. 9, l. 17–18; p. 9, l. 29; p. 9, l. 29; p. 11, l. 19–20; p. 12, l. 6); and

formed to accommodate respective set volumes of adhesive [218] therebeneath for attaching the semiconductor heat spreader [200] to a substrate [204] (p. 7, l. 12–19);

a cross-sectional profile of the plate [200] that is substantially constant along at least one horizontal direction [202] that is perpendicular to the cross-sectional profile of the plate [200] (p. 6, l. 18–20); and

at least one external reversing bend [222] (p. 7, l. 27).

30. The method of claim 29 further comprising:

providing an additional unitary metallic plate [500] (p. 8, l. 18);

forming the additional unitary metallic plate [500] into a unitary auxiliary heat spreader [500] configured for attachment on top of the semiconductor heat spreader [200] (p. 8, l. 17–19); and

forming attachment means for attaching the unitary auxiliary heat spreader [500] to the semiconductor heat spreader [200], the attachment means being selected from tabs [502], locking tabs [502], deformable sides [1408], side ledges [1404], side clips [1610], clip bosses [1612], center clips [1808], side arms [1908], and a combination thereof (p. 8, l. 21; p. 8, l. 21; p. 11, l. 16; p. 11, l. 15; p. 12, l. 10; p. 12, l. 11; p. 12, l. 26–27; p. 13, l. 1).

(6) Grounds for Rejection to be reviewed on appeal

Issue #1:

Whether claims 1-10 and 21-30 were properly rejected under 35 U.S.C. §102(b) as being anticipated by Hawthorne.

(7) Arguments

Issue #1:

Claims 1-10 and 21-30 are rejected under 35 U.S.C. §102(b) as being anticipated by Hawthorne et al. (U.S. Patent No. 6,008,991, hereinafter "Hawthorne").

Summary of Hawthorne:

Hawthorne discloses a packaged integrated circuit with heat spreading standoff support members. An IC device is mounted on a circuit board. Each IC device includes a thin dielectric substrate bearing a plurality of conductive leads. A die is positioned in a hole in the substrate. The die has pads that are bonded to leads carried by the substrate. A circuit board has a thin self-supporting thermally conductive heat spreader. The heat spreader includes fixed standoff and/or alignment pins and a raised central die receiving section.

Arguments:

Claims 1-10 and 21-30 were improperly rejected under 35 U.S.C. §102(b) as being anticipated by Hawthorne.

Regarding claims 1–10 and 21–30, the Appellants respectfully traverse the rejection since the Appellants' claimed combination, as exemplified in claim 1, includes the limitation of the heat spreader not disclosed in Hawthorne of:

> "a cross-sectional profile of the plate that is substantially constant along at least one horizontal direction that is perpendicular to the cross-sectional profile of the plate"

The Examiner states in the Office Action dated August 3, 2006:

> "a cross-sectional profile of the plate that is substantially constant along at least one horizontal direction that is perpendicular to the cross-sectional profile of the plate (see figures 3-4, 9-10)"

However, Hawthorne's cross-sectional profile is not substantially constant. Hawthorne's FIGs. 3-4 and 9-10 show a cross-sectional profile that changes significantly along any horizontal direction that is perpendicular to a cross-sectional profile of Hawthorne's heat spreader.

Please refer first to the following markups of Hawthorne's FIGs. 3 and 4, which have been prepared by the Appellants to show how Hawthorne's FIG. 4 sectional side elevation was taken. (Hawthorne describes FIG. 4 as "a sectional side elevation of the package of

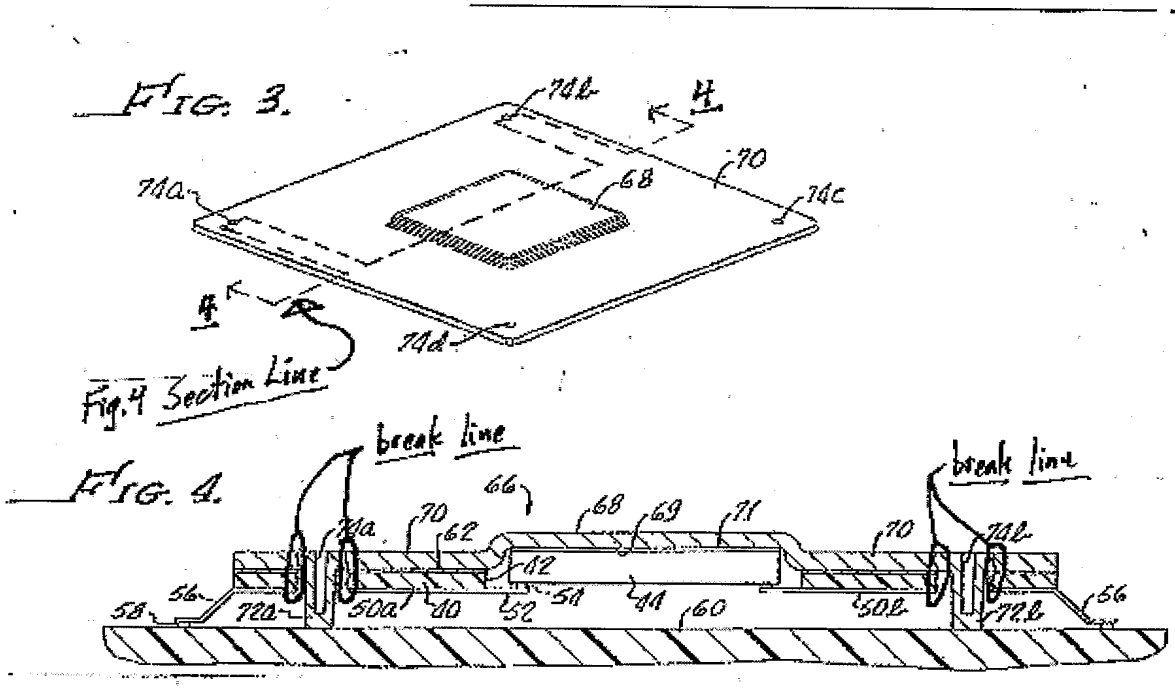


FIG. 3".)

Please then refer to the following cross-sectional profiles A–G of Hawthorne's heat spreader (FIG. 3) which graphically illustrate the dramatic non-constant differences in Hawthorne's cross-sectional profiles along the horizontal direction of arrow 202. (Please note that arrow 202 is the same horizontal arrow that is shown in the present application in FIGs. 2, 12, and 13, and explicitly defined in the present application at page 6, lines 18-20.)

FIG. 3

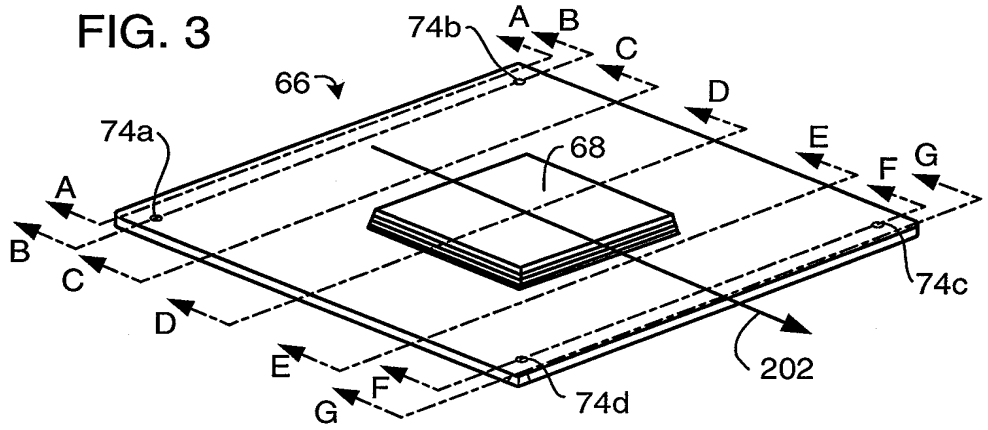


FIG. A

FIG. B

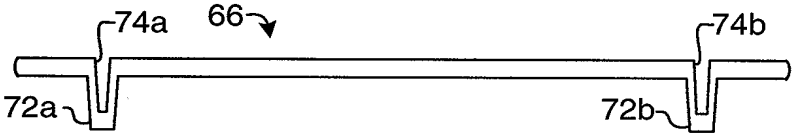


FIG. C

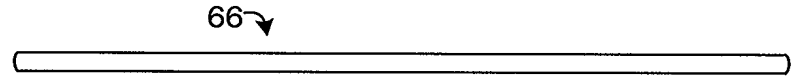


FIG. D

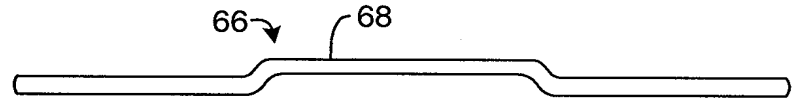


FIG. E

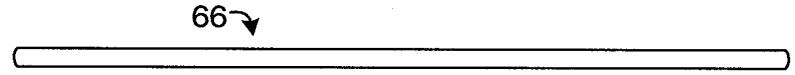


FIG. F

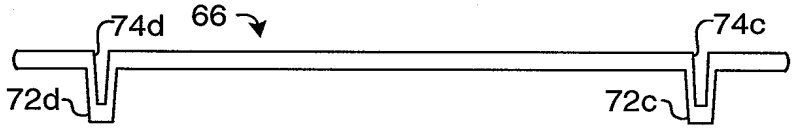
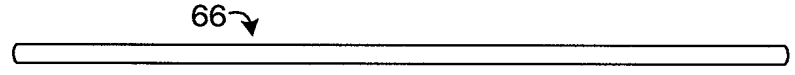


FIG. G



From the above drawings, and with reference to the above-quoted language from the claims, it is obvious that a Hawthorne cross-sectional profile is shown in FIG. A and that the arrow 202 is a horizontal direction perpendicular to that cross-sectional profile. It is also obvious that the Hawthorne cross-sectional profile changes from FIG. A to FIG. B, from FIG. B to FIG. C, from FIG. C to FIG. D, from FIG. D to FIG. E, from FIG. E to FIG. F, and from FIG. F to FIG. G, along the horizontal direction. It is not constant.

When the Hawthorne cross-sectional profile is thus taken along this horizontal direction, it clearly starts off as a thin rectangle, becomes a thin rectangle with two standoff pins (74a and 74b), becomes a thin rectangle again, changes to a thin rectangle with a plateau at the central die receiving section (68), becomes a thin rectangle again, becomes a thin rectangle with two standoff pins (74d and 74c), and ends again as a thin rectangle. Thus, the Hawthorne cross-sectional profile changes along the horizontal direction that is perpendicular to the Hawthorne cross-sectional profile. The Hawthorne cross-sectional profile also changes when it is perpendicular to any other horizontal direction.

Figures A, B, C, D, E, F, and G above thus clearly show that Hawthorne's heat spreader profile is not constant but instead changes significantly not only in just one horizontal direction, but in every horizontal direction. Likewise, Hawthorne's written description of the heat spreader 66 fails to disclose forming a cross-sectional profile that is substantially constant in at least one horizontal direction, as explained in Hawthorne's column 5, lines 19–31, which states:

> "The heat spreader is either molded or stamped in the configuration shown, having a somewhat raised central die receiving section 68 surrounded by lateral sections 70..." [deletions and underlining for clarity]

From this description, and as shown above, it is seen that Hawthorne's heat spreader has a changing topography that results in changes in Hawthorne's cross-sectional profile in any and all horizontal directions, as cross-sections are taken and compared at various horizontal displacements. This is equally true of all of Hawthorne's other drawing FIGs. as well.

It is therefore respectfully submitted that independent claims 1, 9, 21, and 29, and the respective claims 2–8, 10, 22–28, and 30, depending therefrom, are not anticipated by Hawthorne under 35 USC §102(b) because:

> "Anticipation requires the disclosure in a single prior art reference disclosure of each and every element of the claim under consideration." W.L. Gore & Assocs. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983) (citing Soundscriber Corp. v. United States, 360 F.2d 954, 960, 148 USPQ 298, 301 (Ct. Cl.), *adopted*, 149 USPQ 640 (Ct. Cl. 1966)), *cert. denied*, 469 U.S. 851 (1984). Carella v. Starlight Archery, 804 F.2d 135, 138, 231 USPQ 644, 646 (Fed. Cir.), *modified on reh'g*, 1 USPQ 2d 1209 (Fed. Cir.

> 1986); RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984).

Reversal of the rejection is therefore respectfully requested.

Regarding claims 2–8, 10, 22–28, and 30, these dependent claims each depend from respective independent claims 1, 9, 21, and 29, and are believed to be allowable since they contain all the limitations set forth in the independent claims from which they respectively depend and additionally claim non-obvious combinations thereof. Reversal of the rejections of claims 2–8, 10, 22–28, and 30 is therefore respectfully requested because of W.L. Gore & Assocs. v. Garlock, Inc. and the other cases cited therewith, *supra*.

Regarding claims 4 and 24, the Appellants also respectfully traverse the rejection since the Appellants' claimed combination includes the limitation not disclosed in Hawthorne of:

"forming an electromagnetic interference shield for the channel"

The Examiner states in the Office Action:

> "forming an electromagnetic interference shield for the channel (114, so that the magnetic field won't able to go through the metal shield)"

However, Hawthorne's element 114 is a heat spreader, not an electromagnetic interference shield. In fact, Hawthorne makes no reference to forming an electromagnetic interference shield, nor anywhere uses the terms "electromagnetic", "interference", or "shield". Since there is no disclosure, teaching, or suggestion in Hawthorne of the claimed limitation, the Appellants timely requested an Examiner Affidavit disclosing the Examiner's personal knowledge regarding this limitation pursuant to 37 CFR §1.104(d)(2) (2002). However, the Examiner has failed to adduce any evidence to support the Examiner's position. It is therefore respectfully submitted that the Examiner has filed to establish a *prima facie* case for rejection of claims 4 and 24 under 35 U.S.C. §102(b) because:

> "As adapted to *ex parte* procedure, Graham [v. John Deere Co.] is interpreted as continuing to place the 'burden of proof on the Patent Office which requires it to produce the factual basis for its rejection of an application under sections 102 and 103.'" [insertion and underlining for clarity] *In re* Piasecki, 745 F.2d 1468, 223 USPQ 785, 788 (Fed. Cir. 1984), quoting *In re*

> Warner, 379 F.2d 1011, 154 USPQ 173, 177 (C.C.P.A. 1967), *cert. denied*, 389 U.S. 1057 (1968).

Additionally, the Examiner has failed to comply with MPEP §707.07(f) and *Ex parte* Schricker, 56 USPQ2d 1723 (B.P.A.I. 2000) (unpublished), thereby entitling the Appellants to allowance of claims 4 and 24:

> "707.07(f) Answer All Material Traversed [R-3]
>
> ...
>
> Where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it.
>
> ...
>
> ANSWERING ASSERTED ADVANTAGES
>
> ...
>
> The importance of answering applicant's arguments is illustrated by *In re Herrmann*, 261 F.2d 598, 120 USPQ 182 (CCPA 1958) where the applicant urged that the subject matter claimed produced new and useful results. The court noted that since applicant's statement of advantages was not questioned by the examiner or the Board of Appeals, it was constrained to accept the statement at face value and therefore found certain claims to be allowable. See also *In re Soni*, 54 F.3d 746, 751, 34 USPQ2d 1684, 1688 (Fed. Cir. 1995) (Office failed to rebut applicant's argument)." [underlining for clarity]

> "The examiner has left applicant and the board to guess at the basis of the rejection and after having us guess would have us figure out (i.e., further guess) what part of which [prior art] document supports the rejection. We are not good at guessing; hence, we decline to guess." *Ex parte* Schricker, 56 USPQ2d 1723 (B.P.A.I. 2000) (unpublished).

Accordingly, it is respectfully submitted that the Appellants are entitled to reversal of this rejection and to allowance of claims 4 and 24 per MPEP §707.07(f) and *Ex parte* Schricker. Allowance of claims 4 and 24 is accordingly respectfully requested.

Regarding claims 5, 10, 25, and 30, the Appellants also respectfully traverse the rejection since the Appellants' claimed combination includes the limitation not disclosed in figures 9-10 of Hawthorne of:

> "forming...auxiliary heat spreader" [deletions for clarity]

The Examiner states in the Office Action:

> "forming...auxiliary heat spreader configured for attachment on top of the semiconductor heat spreader (see figures 9-10)." [deletions for clarity]

However, the structures in figures 9-10 of Hawthorne are shipping trays, not auxiliary heat spreaders (Hawthorne col. 8, lines 28-31). Reversal of the rejection is therefore respectfully requested on this ground as well because of W.L. Gore & Assocs. v. Garlock, Inc. and the other cases cited therewith, *supra*.

Additionally, the Examiner has not answered the Appellants' prior arguments (repeated just above) concerning this traversed issue, as required by MPEP §707.07(f). Accordingly, it is respectfully submitted that the Appellants are entitled to reversal of this rejection and to allowance of claims 5, 10, 25, and 30 per MPEP §707.07(f) and *Ex parte* Schricker, *supra*. Allowance of claims 5, 10, 25, and 30 is accordingly respectfully requested.

Regarding claims 6, 10, 26, and 30, the Appellants also respectfully traverse the rejection since the Appellants' claimed combination includes the limitation not disclosed in Hawthorne of:

> "forming attachment means...selected from tabs, locking tabs, deformable sides, side ledges, side clips, clip bosses, center clips, side arms, and a combination thereof." [deletions for clarity]

The Examiner states in the Office Action:

> "forming attachment means...selected from tabs, locking tabs, deformable sides, side ledges, side clips, clip bosses, center clips, side arms, and a combination thereof (legs, 124/126/158/160)" [deletions for clarity]

However, Hawthorne makes no reference to forming attachment means selected from tabs, locking tabs, deformable sides, side ledges, side clips, clip bosses, center clips, side arms, and a combination thereof, nor discloses those of the present invention, as claimed in claims 6, 10, 26, and 30. The legs 124/126/158/160 of Hawthorne cited by the Examiner are legs of the shipping tray sections, not attachment means for an auxiliary heat spreader (Hawthorne col. 8, lines 7-8 and col. 8, line 37). Reversal of the rejection is therefore

respectfully requested on this ground as well because of W.L. Gore & Assocs. v. Garlock, Inc. and the other cases cited therewith, *supra*.

Additionally, the Examiner has not answered the Appellants' prior arguments (repeated just above) concerning this traversed issue, as required by MPEP §707.07(f). Accordingly, it is respectfully submitted that the Appellants are entitled to reversal of this rejection and to allowance of claims 6, 10, 26, and 30 per MPEP §707.07(f) and *Ex parte* Schricker, *supra*. Allowance of claims 6, 10, 26, and 30 is accordingly respectfully requested.

Regarding claims 7 and 27–28, the Appellants also respectfully traverse the rejection since the Appellants' claimed combination includes the limitation not disclosed in Hawthorne of:

"form an integral auxiliary heat spreader"

The Examiner states in the Office Action:

> "...form an integral auxiliary heat spreader located on top of the panel (see figures 4, 9, 10)." [deletions for clarity]

However, there is no auxiliary structure in figure 4 of Hawthorne, and the structures in FIGs. 9-10 of Hawthorne are shipping trays, not auxiliary heat spreaders, as explained above. Reversal of the rejection is therefore respectfully requested on this ground as well because of W.L. Gore & Assocs. v. Garlock, Inc. and the other cases cited therewith, *supra*.

Additionally, the Examiner has not answered the Appellants' prior arguments (repeated just above) concerning this traversed issue, as required by MPEP §707.07(f). Accordingly, it is respectfully submitted that the Appellants are entitled to reversal of this rejection and to allowance of claims 7 and 27–28 per MPEP §707.07(f) and *Ex parte* Schricker, *supra*. Allowance of claims 7 and 27–28 is accordingly respectfully requested.

Regarding claims 8, 9, 21, and 29, the Appellants also respectfully traverse the rejection since the Appellants' claimed combination includes the limitation not disclosed in Hawthorne of:

"forming the unitary metallic plate in substantially a single metal forming process into a cross-sectional profile that is substantially constant in at least one horizontal direction."

The Examiner states in the Office Action:

"...forming the unitary metallic plate in substantially a single metal forming process into a cross-sectional profile that is substantially constant in at least one horizontal direction that is perpendicular to the cross-sectional profile of the plate (see figures 3–4, 9–10)." [deletions for clarity]

However, Hawthorne makes no reference to forming a cross-sectional profile that is substantially constant in at least one horizontal direction that is perpendicular to the cross-sectional profile of the plate, nor discloses forming the constant profile of the present invention as claimed in claims 8, 9, 21, and 29. Reversal of the rejection is therefore respectfully requested on this ground as well because of W.L. Gore & Assocs. v. Garlock, Inc. and the other cases cited therewith, *supra*.

Additionally, the Examiner has not answered the Appellants' prior arguments (repeated just above) concerning this traversed issue, as required by MPEP §707.07(f). Accordingly, it is respectfully submitted that the Appellants are entitled to reversal of this rejection and to allowance of claims 8, 9, 21, and 29 per MPEP §707.07(f) and *Ex parte* Schricker, *supra*. Allowance of claims 8, 9, 21, and 29 is accordingly respectfully requested.

Based on all of the above, it is respectfully submitted that claims 1-10 and 21-30 are allowable under 35 U.S.C. §102(b) as being unanticipated by Hawthorne.

This rejection should accordingly be reversed.

(8) Claims Appendix

See Appendix I

(9) Evidence Appendix

See Appendix II

(10) Related Proceedings Appendix

See Appendix III

Conclusion and Relief Requested:

With respect to the issue presented in this appeal as set forth above in section (6), the Appellants hereby solicit a ruling that:

(a) Claims 1-10 and 21-30 were improperly rejected under 35 U.S.C. §102(b) as being anticipated by Hawthorne. This rejection should be reversed.

(b) Claims 1-10 and 21-30 are patentable over the prior art.

Reversal of the Examiner's decision is respectfully requested.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 50-0374 and please credit any excess fees to such deposit account.

Respectfully submitted,

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APPENDICES follow on separate pages

(8) Claims appendix

Appendix I – Claims on Appeal

1. A method for fabricating a semiconductor heat spreader, comprising:

providing a unitary metallic plate; and

forming the unitary metallic plate into:

a panel;

channel walls depending from the panel to define a channel between the channel walls and the panel for receiving a semiconductor therein;

at least two feet extending from respective channel walls for attachment to a substrate;

at least one external reversing bend; and

a cross-sectional profile of the plate that is substantially constant along at least one horizontal direction that is perpendicular to the cross-sectional profile of the plate.

2. The method of claim 1 wherein the feet are selected from an arched foot, a stand-off foot, a slotted stand-off foot, a toed foot, a stand-off toed foot, a flat foot, a slotted flat foot, a zigzag foot, a box foot, and a combination thereof.

3. The method of claim 1 further comprising forming the feet to accommodate respective set volumes of adhesive therebeneath for attaching the semiconductor heat spreader to a substrate.

4. The method of claim 1 further comprising forming an electromagnetic interference shield for the channel.

5. The method of claim 1 further comprising:

providing an additional unitary metallic plate; and

forming the additional unitary metallic plate into a unitary auxiliary heat spreader configured for attachment on top of the semiconductor heat spreader.

6. The method of claim 5 further comprising forming attachment means for attaching the unitary auxiliary heat spreader to the semiconductor heat spreader, the

attachment means being selected from tabs, locking tabs, deformable sides, side ledges, side clips, clip bosses, center clips, side arms, and a combination thereof.

7. The method of claim 1 wherein forming the unitary metallic plate further comprises forming the unitary metallic plate in substantially a single metal forming process to also form an integral auxiliary heat spreader located on top of the panel.

8. The method of claim 1 wherein forming the unitary metallic plate further comprises forming the unitary metallic plate in substantially a single metal forming process into a cross-sectional profile that is substantially constant in at least one horizontal direction.

9. A method for fabricating a semiconductor heat spreader, comprising:

providing a unitary metallic plate;

forming the unitary metallic plate in substantially a single metal forming process into:

a panel;

channel walls depending from opposite sides of the panel to define a channel between the channel walls and the panel for receiving a semiconductor therein;

at least two feet extending from respective channel walls on opposite sides of the panel for attachment to a substrate, the feet being:

selected from an arched foot, a stand-off foot, a slotted stand-off foot, a toed foot, a stand-off toed foot, a flat foot, a slotted flat foot, a zigzag foot, a box foot, and a combination thereof; and

formed to accommodate respective set volumes of adhesive therebeneath for attaching the semiconductor heat spreader to a substrate;

a cross-sectional profile of the plate that is substantially constant along at least one horizontal direction that is perpendicular to the cross-sectional profile of the plate; and

at least one external reversing bend.

10. The method of claim 9 further comprising:

providing an additional unitary metallic plate;

forming the additional unitary metallic plate in substantially a single metal forming process into a unitary auxiliary heat spreader configured for attachment on top of the semiconductor heat spreader; and

forming attachment means for attaching the unitary auxiliary heat spreader to the semiconductor heat spreader, the attachment means being selected from tabs, locking tabs, deformable sides, side ledges, side clips, clip bosses, center clips, side arms, and a combination thereof.

Claims 11-20 (canceled)

21. A method for fabricating a semiconductor heat spreader, comprising:

providing a unitary metallic plate;

forming the unitary metallic plate into:

a panel;

channel walls depending from the panel to define a channel between the channel walls and the panel for receiving a semiconductor therein;

at least two feet extending from respective channel walls for attachment to a substrate;

at least one external reversing bend; and

a cross-sectional profile of the plate that is substantially constant along at least one horizontal direction that is perpendicular to the cross-sectional profile of the plate; and

forming the unitary metallic plate to also form an integral auxiliary heat spreader located on top of the panel.

22. The method of claim 21 wherein the feet are selected from an arched foot, a stand-off foot, a slotted stand-off foot, a toed foot, a stand-off toed foot, a flat foot, a slotted flat foot, a zigzag foot, a box foot, and a combination thereof.

23. The method of claim 21 further comprising forming the feet to accommodate respective set volumes of adhesive therebeneath for attaching the semiconductor heat spreader to a substrate.

24. The method of claim 21 further comprising forming an electromagnetic interference shield for the channel.

25. The method of claim 21 further comprising:

providing an additional unitary metallic plate; and

forming the additional unitary metallic plate into a unitary auxiliary heat spreader configured for attachment on top of the semiconductor heat spreader.

26. The method of claim 25 further comprising forming attachment means for attaching the unitary auxiliary heat spreader to the semiconductor heat spreader, the attachment means being selected from tabs, locking tabs, deformable sides, side ledges, side clips, clip bosses, center clips, side arms, and a combination thereof.

27. The method of claim 21 wherein forming the unitary metallic plate further comprises forming the unitary metallic plate in substantially a single metal forming process to also form an integral auxiliary heat spreader located on top of the panel.

28. The method of claim 21 wherein forming the unitary metallic plate further comprises forming the unitary metallic plate in substantially a single metal forming process into a cross-sectional profile that is substantially constant in at least one horizontal direction.

29. A method for fabricating a semiconductor heat spreader, comprising:

providing a unitary metallic plate;

forming the unitary metallic plate into:

a panel;

channel walls depending from opposite sides of the panel to define a channel between the channel walls and the panel for receiving a semiconductor therein;

at least two feet extending from respective channel walls on opposite sides of the panel for attachment to a substrate, the feet being:

selected from an arched foot, a stand-off foot, a slotted stand-off foot, a toed foot, a stand-off toed foot, a flat foot, a slotted flat foot, a zigzag foot, a box foot, and a combination thereof; and

formed to accommodate respective set volumes of adhesive therebeneath for attaching the semiconductor heat spreader to a substrate;

a cross-sectional profile of the plate that is substantially constant along at least one horizontal direction that is perpendicular to the cross-sectional profile of the plate; and

at least one external reversing bend.

30. The method of claim 29 further comprising:

providing an additional unitary metallic plate;

forming the additional unitary metallic plate into a unitary auxiliary heat spreader configured for attachment on top of the semiconductor heat spreader; and

forming attachment means for attaching the unitary auxiliary heat spreader to the semiconductor heat spreader, the attachment means being selected from tabs, locking tabs, deformable sides, side ledges, side clips, clip bosses, center clips, side arms, and a combination thereof.

(9) Evidence appendix

Appendix *II*

Evidence under 37 CFR 1.130, 1.131, or 1.132 entered by examiner and relied upon by appellant or any other evidence entered by the examiner and relied upon by appellant in the appeal, along with a statement setting forth where in the record that evidence was entered by the examiner

(37 CFR 41.37(c)(1)(ix)

None

(10) Related Proceedings appendix

APPENDIX III

Decisions rendered by a court or the Board identified in Related Appeals and Interferences section

(37 CFR 41.37(c)(1)(x)

Copies of the following decisions are herein enclosed:

None